

Pushing the Envelope			
2005 Mathematics			
Learning Standards			
District of Columbia Mathematics			
Grade 5			
Activity/Lesson	State	Standards	
Chemistry (pgs. 25-41)	DC	MA.5.PRA.2	Replace variables with given values, evaluate, and simplify (e.g., $2(\text{"circle"}) + 3$ when "circle" = 4).
Chemistry (pgs. 25-41)	DC	MA.5.M.1	Apply the concepts of perimeter and area to the solution of problems involving triangles and rectangles. Apply formulas where appropriate.
Chemistry (pgs. 25-41)	DC	MA.5.M.2	Apply formulas for the areas of triangles, rectangles, and parallelograms; recognize that shapes with the same number of sides but different appearances can have the same area.
Physics and Math (pgs. 43-63)	DC	MA.5.NSO-F.8	Explain different interpretations of fractions as a ratio of whole numbers, as parts of unit wholes, as parts of a collection, as division of whole numbers by whole numbers, and as locations on the number line.
Physics and Math (pgs. 43-63)	DC	MA.5.PRA.2	Replace variables with given values, evaluate, and simplify (e.g., $2(\text{"circle"}) + 3$ when "circle" = 4).
Physics and Math (pgs. 43-63)	DC	MA.5.M.1	Apply the concepts of perimeter and area to the solution of problems involving triangles and rectangles. Apply formulas where appropriate.
Physics and Math (pgs. 43-63)	DC	MA.5.M.2	Apply formulas for the areas of triangles, rectangles, and parallelograms; recognize that shapes with the same number of sides but different appearances can have the same area.
Rocket Activity (pgs. 69-75)	DC	MA.5.M.1	Apply the concepts of perimeter and area to the solution of problems involving triangles and rectangles. Apply formulas where appropriate.
Rocket Activity (pgs. 69-75)	DC	MA.5.M.2	Apply formulas for the areas of triangles, rectangles, and parallelograms; recognize that shapes with the same number of sides but different appearances can have the same area.
Pushing the Envelope			
2005 Mathematics			
Learning Standards			
District of Columbia Mathematics			
Grade 6			
Activity/Lesson	State	Standards	
Types of Engines (pgs. 11-23)	DC	MA.6.PRA.8	Recognize when information given in a table, graph, or formula suggests a proportional or linear relationship.
Chemistry (pgs. 25-41)	DC	MA.6.PRA.8	Recognize when information given in a table, graph, or formula suggests a proportional or linear relationship.

Chemistry (pgs. 25-41)	DC	MA.6.M.1	Differentiate between and use appropriate units of measures for two- and three-dimensional objects (i.e., when finding perimeter, area, and volume).
Chemistry (pgs. 25-41)	DC	MA.6.M.5	Understand the concept of volume; use the appropriate units in common measuring systems (e.g., cubic inch, cubic centimeter, cubic meter, cubic yard) to compute the volume of rectangular solids, including rectangular prisms.
Physics and Math (pgs. 43-63)	DC	MA.6.PRA.1	Use the properties of equality to solve problems using letter name variables (e.g., $\frac{1}{4} + x = \frac{7}{12}$ ).
Physics and Math (pgs. 43-63)	DC	MA.6.PRA.3	Identify and describe relationships between two variables with a constant rate of change (e.g., perimeter-side relationship for a square, distance-time graphs, and conversions such as feet to inches). Contrast these with relationships where the rate of change is not constant.
Physics and Math (pgs. 43-63)	DC	MA.6.DASP.2	Construct circle graphs using ratios, proportions, and percentages.
Physics and Math (pgs. 43-63)	DC	MA.6.DASP.5	Represent two numerical variables on a scatterplot, and describe any apparent relationship that exists between the two variables (e.g., between time spent on homework and grades in class).
Rocket Activity (pgs. 69-75)	DC	MA.6.PRA.8	Recognize when information given in a table, graph, or formula suggests a proportional or linear relationship.

### Pushing the Envelope

#### 2005 Mathematics

#### Learning Standards

District of Columbia Mathematics			
Grade 7			
Activity/Lesson	State	Standards	
Types of Engines (pgs. 11-23)	DC	MA.7.PRA.2	Evaluate simple algebraic expressions for given variable values (e.g., $3a^2 - b$ for $a = 3$ and $b = 7$ ).
Chemistry (pgs. 25-41)	DC	MA.7.PRA.2	Evaluate simple algebraic expressions for given variable values (e.g., $3a^2 - b$ for $a = 3$ and $b = 7$ ).
Physics and Math (pgs. 43-63)	DC	MA.7.NSO-N.8	Express ratios in several ways (e.g., 3 cups to 5 people; 3:5; $\frac{3}{5}$ ); recognize and find equivalent ratios.
Physics and Math (pgs. 43-63)	DC	MA.7.NSO-C.14	Use ratios and proportions in the solution of problems involving unit rates, scale drawings, and reading of maps.

Physics and Math (pgs. 43-63)	DC	MA.7.M.2	Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms and cylinders.
Physics and Math (pgs. 43-63)	DC	MA.7.M.5	Use ratio and proportion, including scale factors, in the solution of problems.
Rocket Activity (pgs. 69-75)	DC	MA.7.M.2	Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms and cylinders.
<b>Pushing the Envelope</b>			
<b>2005 Mathematics</b>			
<b>Learning Standards</b>			
<b>District of Columbia Mathematics</b>			
<b>Grade 8</b>			
<b>Activity/Lesson</b>	<b>State</b>	<b>Standards</b>	
History of Aviation Propulsion (pgs. 5-9)	DC	MA.8.PRA.7	Interpret the formula $(-x)(-y) = xy$ in calculations involving such things as distance, speed, and time, or in the graphing of linear functions. Use this identity to simplify algebraic expressions [e.g., $(-2)(-x + 2) = 2x - 4$ ].
Types of Engines (pgs. 11-23)	DC	MA.8.NSO-C.10	Solve problems involving derived quantities such as density, velocity, and weighted averages.
Types of Engines (pgs. 11-23)	DC	MA.8.PRA.7	Interpret the formula $(-x)(-y) = xy$ in calculations involving such things as distance, speed, and time, or in the graphing of linear functions. Use this identity to simplify algebraic expressions [e.g., $(-2)(-x + 2) = 2x - 4$ ].
Chemistry (pgs. 25-41)	DC	MA.8.PRA.7	Interpret the formula $(-x)(-y) = xy$ in calculations involving such things as distance, speed, and time, or in the graphing of linear functions. Use this identity to simplify algebraic expressions [e.g., $(-2)(-x + 2) = 2x - 4$ ].
Chemistry (pgs. 25-41)	DC	MA.8.M.2	Understand the concept of surface area and volume; given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres.
Chemistry (pgs. 25-41)	DC	MA.8.M.4	Solve problems about similar figures and scale drawings. Understand that when the lengths of all dimensions of an object are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor.

Physics and Math (pgs. 43-63)	DC	MA.8.NSO-C.9	Solve problems involving ratio units such as miles per hour, dollars per pound, or persons per square mile.
Physics and Math (pgs. 43-63)	DC	MA.8.PRA.1	Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and x- and y-intercepts of different linear patterns.
Physics and Math (pgs. 43-63)	DC	MA.8.PRA.7	Interpret the formula $(-x)(-y) = xy$ in calculations involving such things as distance, speed, and time, or in the graphing of linear functions. Use this identity to simplify algebraic expressions [e.g., $(-2)(-x + 2) = 2x - 4$ ].
Physics and Math (pgs. 43-63)	DC	MA.8.PRA.8	Explain and analyze — both quantitatively and qualitatively, using pictures, graphs, charts, and equations — how a change in one variable results in a change in another variable in functional relationships e.g., $C = \pi(d)$ , $A = \pi(r^2)$ (A as a function of r), $A(\text{sub-rectangle}) = lw$ ( $A(\text{sub-rectangle})$ as a function of l and w).
Physics and Math (pgs. 43-63)	DC	MA.8.PRA.9	Graph a linear equation using ordered pairs; identify and represent the graphs of linear functions.
Rocket Activity (pgs. 69-75)	DC	MA.8.PRA.7	Interpret the formula $(-x)(-y) = xy$ in calculations involving such things as distance, speed, and time, or in the graphing of linear functions. Use this identity to simplify algebraic expressions [e.g., $(-2)(-x + 2) = 2x - 4$ ].
<b>Pushing the Envelope</b>			
<b>2005 Mathematics</b>			
<b>Learning Standards</b>			
<b>District of Columbia Mathematics</b>			
<b>Grades 9-12 (Algebra I)</b>			
<b>Activity/Lesson</b>	<b>State</b>	<b>Standards</b>	
Physics and Math (pgs. 43-63)	DC	MA.AI.N.3	Calculate and apply ratios, proportions, rates, and percentages to solve a range of consumer and practical problems.
Physics and Math (pgs. 43-63)	DC	MA.AI.P.4	Translate between different representations of functions and relations: graphs, equations, sets of ordered pairs (scatter plots), verbal, and tabular.